

Speaker Background - Presentation Summaries

Welcome and Program Overview

Steve Borroum, PE - Background

Steve Borroum is the California Department of Transportation's Chief Environmental Engineer. Steve has worked in transportation for approximately 25 years, with a focus on environmental issues for approximately the past 11 years. This has included jobs in the private sector, and with various State and local government agencies in California and Nevada. Steve received his Civil Engineering degree from the University of Nevada, Reno, and studied environmental engineering in graduate school at Oregon State University under an EPA funded fellowship. Steve is registered as both a Civil and Traffic Engineer in the State of California.

Retrofit Pilot and Litter Treatment Device Performance

Ken Smarkel, Ph.D., PE, Moderator - Background

Dr. Ken Smarkel is currently the Storm Water Treatment Technology Research Manager for Caltrans. He received his bachelor's, master's, and doctorate in Sanitary Engineering from Ohio State University and has spent the last 22 years of his career divided between the government and private sectors. He has worked as a regulator for the Regional and State Water Boards, and the Department of Toxic Substances Control (DTSC). In the private sector he worked as a consultant for two non-profit research organizations and for Jacobs Engineering where he managed the remedial investigation of the industrialized areas of McClellan Air Force Base. His research credentials include project manager for field-testing of hazardous waste treatment technologies at DTSC and establishment of a treatment technology-testing program at McClellan AFB. For the past year he has directed the statewide Caltrans Storm Water Treatment Technology Research program, which currently has over 50 full-scale pilots in the field and is operating a small scale, multi-train pilot facility at Lake Tahoe.

Retrofit Pilot and Litter Treatment Device Performance (continued)

Scott Taylor, PE, Speaker - Background

Mr. Scott Taylor is Vice President of Storm Water Management at RBF Consulting in Irvine, California. Mr. Taylor has a background in flood control engineering and has completed projects in the areas of flood plain mapping, alluvial channel design, regional and local hydrology analysis, hydraulic analysis and design, open channel design, large diameter storm drain design and sediment transport analysis. Mr. Taylor also has significant experience in storm water quality. Recent projects include a receiving water study for the San Diego Creek watershed in Orange County, Ca. The study was used to assist the local Regional Board in establishing a toxicity TMDL for Upper Newport Bay. Mr. Taylor has also served as the Project Manager for the BMP Retrofit Pilot Program on behalf of Caltrans. The Retrofit Pilot Program investigated the costs and benefits of retrofitting conventional structural BMPs at 33 locations in existing highway infrastructure. Mr. Taylor has authored numerous papers for ASCE conference proceedings, has taught undergraduate courses in hydrology and hydraulic analysis for California Universities, coordinates and teaches in a P.E. License Review Course, teaches a course on BMP design for ASCE continuing education and has lectured to the Hong Kong government on BMP effectiveness.

Michael Barrett, Ph.D., PE, Speaker - Background

Dr. Michael Barrett is Associate Director of the Center for Research in Water Resources at the University of Texas at Austin. Dr. Barrett's research interests are focused on the quality, impacts, and mitigation of urban, agricultural, and construction site stormwater runoff and he has conducted numerous studies nationwide in this area. These projects involved the statistical analysis of water quality data, the evaluation of structural and nonstructural best management practices, and the development of watershed based stormwater management plans. He has published extensively in peer reviewed technical journals on the characterization and control of stormwater impacts, winning the 2000 ASCE Arthur M. Wellington Prize for stormwater research. During the last two years, Dr. Barrett has participated in stormwater projects in Texas, California, Arizona, and Oregon, including the Caltrans BMP Retrofit Pilot Program. In the Caltrans study, he provided siting, design, and monitoring guidance for all the structural controls being evaluated and is currently lead author of the final report documenting the findings.

Retrofit Pilot and Litter Treatment Device Performance (continued)

Scott Taylor and Michael Barrett, Speakers - Presentation Summary

Results of the Caltrans BMP Retrofit Pilot Program

Caltrans recently completed the evaluation of 13 structural BMPs installed at 39 sites in the Los Angeles and San Diego areas to treat stormwater runoff from highways and associated facilities. The objectives of the study included an assessment of the constituent removal, determination of the technical feasibility, evaluation of the operational aspects, and assessment of the construction and maintenance costs of each of the technologies. Scott Taylor will describe the BMPs that were evaluated in the study and highlight some of the siting and construction challenges in the retrofit environment, including cost. Dr. Barrett will summarize the water quality performance of the various BMPs for the constituents of concern in highway runoff, describe some of the critical design elements identified and present a novel way to compare the expected benefits for each of the technologies.

Byron J. Berger, P.E., Speaker - Background

As a member of the Storm Water Unit at the Caltrans Division of Environmental Analysis, Mr. Berger provides technical and regulatory guidance on storm water-related issues to the 12 Caltrans districts. He also works to develop new and modified storm water treatment technologies and subjects them to rigorous multi-year field-testing. Mr. Berger coordinates with state and regional offices of the State Water Resources Control Board on issues related to technical guidance including the hydraulics, hydrology, and design of structural best management practices.

Byron J. Berger - Presentation Summary

Gross Solids Removal Devices

Caltrans' storm water program continually develops and tests modified and new storm water treatment technologies in compliance with its Statewide Storm Water Management Plan (SWMP). This compliance with the SWMP, coupled with stringent local Total Maximum Daily Load (TMDL) requirements for litter in Los Angeles, led to the development and testing of structural BMPs designed to remove litter and vegetative debris (collectively called "gross pollutants" or "gross solids"). Mr. Berger will present a summary of these devices, called Gross Solids Removal Devices (GSRDs), including siting, design, construction, and performance data.

Edward F. Othmer Jr., P.E., Session Expert - Background

Mr. Othmer has over nine years of engineering and project management experience and is a registered Civil Engineer in California. He has a M.S. in Civil Engineering with emphasis in Water Resources Engineering from Tufts University. As a Project Manager and Principal Engineer with LAW Engineering and Environmental Services, Inc., Mr. Othmer has managed a variety of large-scale stormwater management programs for the United States Navy and Caltrans. For the past four years, Ed has been managing the Caltrans BMP Retrofit Pilot Study for in Los Angeles County.

Vectors in Treatment Facilities

Dean F. Messer, Ph.D., Moderator - Background

Dr. Messer has facilitated and coordinated the vector monitoring efforts of Caltrans BMPs on behalf of the Caltrans Stormwater Program since 1997. Dr. Messer has more than twenty years experience in environmental research and has participated in a wide range of projects during that time. These include assessing the toxicity of agricultural drainwater in the San Joaquin Valley, the effects of land development on the clarity of Lake Tahoe and the effects of logging practices on water quality on California's northern coast. More recently, Dr. Messer has taken part in a number of stormwater related projects including BMP pollutant removal efficiency assessments, pathogen detection studies and herbicide runoff characterizations. Prior to joining Larry Walker Associates, Dr. Messer served as a faculty member at the University of California, Davis where he taught courses in environmental science and hydrology, and conducted research on various water quality issues.

Vicki Kramer, Ph.D., Speaker - Background

Vicki Kramer has been the Chief of the Vector-Borne Disease Section, California Department of Health Services, since 1995. Prior to working for the state, she served as the Manager for Santa Cruz Mosquito and Vector Control District and as Entomologist for Contra Costa Mosquito Control District. She obtained her Ph.D. in entomology from the University of California at Berkeley in 1988. Dr. Kramer's dissertation research focused on the ecology and biological control of mosquitoes in rice fields. She continues to be involved with research on the ecology, epidemiology, and control of vector-borne diseases.

Vicki Kramer - Presentation Summary

Mosquitoes and Public Health in California

Since 1999, the California Department of Health Services, Vector-Borne Disease Section (VBDS) has provided the California Department of Transportation (Caltrans) and other agencies with technical expertise on vectors and vector-borne diseases relative to the Caltrans Storm Water Best Management Practice (BMP) Retrofit Pilot Project. BMPs potentially create a public health hazard by increasing habitat availability for aquatic stages of mosquitoes, and by creating harborage, food, and moisture for other reservoir and nuisance species. This presentation will discuss the biology and ecology of mosquitoes, and their public health importance in California. Emerging public health threats, such as the detection in 2001 of the exotic Asian tiger mosquito and the westward expansion of mosquito-borne West Nile virus, will be summarized to illustrate the importance of cooperation and partnership at all levels of government. The public health powers of DHS, including the power to abate public nuisances (Health & Safety Code, §100175), and those of local mosquito and vector control agencies (Health & Safety Code, §2272) will be discussed.

Vectors in Treatment Facilities (continued)

Marco E. Metzger, Ph.D., Speaker - Background

Marco E. Metzger received his Bachelor's of Science in Biology from San Diego State University in 1992. In 1993, he joined the graduate program in Entomology (study of insects) at the University of California, Riverside, where he completed a Master's degree in 1995 followed by a Ph.D. in 2000. Shortly afterwards, he joined the Vector-Borne Disease Section, California Department of Health Services as a Public Health Biologist.

Marco's fascination with insects began when he was merely a small larva. His broad background in entomology is a result of decades of personal and professional studies. His specialty is in urban pests (particularly fleas, cockroaches, ants, termites, and spiders), and those that can cause discomfort or transmit disease to humans.

During the past 18 months, Marco has been actively involved in vector issues (e.g. mosquitoes) associated with structural stormwater Best Management Practices (BMPs). He has worked closely with Caltrans, local southern California vector control agencies, and stormwater consultants in preparing a detailed study on mosquito production within stormwater BMPs and has helped develop modifications to BMPs to minimize mosquito breeding.

Marco has authored and co-authored a series of inter-agency reports based on the vector/BMP study, prepared two feature magazine articles, and has presented findings at scientific conferences, continuing education seminars, and informal meetings. In addition, he has made contact with over 150 agencies nationwide (i.e. public works, transportation, environmental, vector control) in an effort to better understand the vector/BMP association. Marco is currently working with State and Regional water quality control boards to enhance their awareness of the potential health hazards associated with certain BMPs that create vector breeding habitat and has recommended that provisions be included into stormwater runoff permits to ensure that these hazards are minimized or eliminated.

Vectors in Treatment Facilities (continued)

Marco E. Metzger - Presentation Summary

The Downside of Stormwater Runoff Management:

Disease Vectors Associated with Structural BMPs in southern California

For over two years, the California Department of Health Services, Vector-Borne Disease Section (VBDS), in collaboration with the California Department of Transportation (Caltrans), four local mosquito and vector control districts in southern California, and stormwater consultants, has been involved in a unique study investigating the association between vectors and structural Best Management Practices (BMPs) implemented for stormwater runoff quality enhancement. This study included 37 BMPs in San Diego and Los Angeles Counties built as part of the Caltrans Storm Water BMP Retrofit Pilot Project. The BMPs were monitored for mosquito abundance, vegetative cover, predators of immature mosquitoes, physical and chemical properties of water, and evidence of rodent and other vector populations. To date, eight mosquito species have been collected from Caltrans BMP structures, four of which are vectors of human disease. Of the eight different BMP technologies implemented by Caltrans, those that maintained permanent sources of standing water in sumps or basins provided excellent habitat for mosquitoes and frequently supported large populations relative to other designs. In contrast, BMPs designed to drain rapidly provided less suitable habitats and rarely harbored mosquitoes. The information gathered during this study has helped to determine what factors within BMPs are most conducive to mosquito production and which species utilize these structures. Based on these findings, appropriate engineering modifications were recommended to minimize the potential of certain BMPs to produce or harbor vectors. It is critical that as these structures are built to improve the quality of stormwater runoff, public health hazards are not created.

Mike Devine, REHS, Session Expert - Background

Mike Devine is a Supervising Vector Ecologist with the San Diego County Department of Environmental Health, Vector Surveillance and Control Program. He has worked with the Department of Environmental Health for 32 years in water quality, land use and food safety programs. His current activities include the collection of mosquito population data and monitoring for the occurrence of the agents of vector-borne diseases such as plague, hantavirus, encephalitis and malaria.

Infiltration Technology

Brian Currier, PE, Speaker - Background

Brian Currier is a Registered Civil Engineer currently working for the University of California, Davis as a staff research engineer. He received his Bachelor of Science and Master of Science in Civil and Environmental Engineering from the University of California, Davis. For more than three years, he has been extensively involved with the Caltrans BMP Retrofit Pilot Program as the project manager of the pilot studies.

Brian Currier - Presentation Summary

Infiltration BMPs: Caltrans Retrofit Pilot Study Experience

Caltrans constructed and operated infiltration basin and trenches as part of the Caltrans Best Management Practice (BMP) Retrofit Pilot Study Program. Fifty-two sites adjacent to highways and maintenance facilities in the Los Angeles and San Diego areas were evaluated and two infiltration basins and two infiltration trenches were constructed. One basin and one trench successfully met design expectations, which in California includes a 3-day drain time to prevent mosquito breeding. The drain time of the trench at the Carlsbad Maintenance Station in San Diego County was about twice as long as intended. The infiltration basin at I-5 at La Costa Ave., also in San Diego County, required months to drain. Based on post-construction analysis, contributing causes of these problems were inaccurate estimates of infiltration rates and groundwater depth, and application of inappropriate siting and design criteria. The short-term in-hole permeability tests resulted in higher estimates of infiltration rates than were later observed. Fluctuations in groundwater depth were larger than anticipated. Based on this experience and on computer modeling of one site, Federal Highway Administration recommendations for minimum infiltration rate and depth to groundwater can result in infiltration BMPs that do not meet performance requirements in California. Additionally, water quality considerations may also affect siting criteria and maintenance requirements, as impacts are better understood. The groundwater quality information gathered during the Caltrans study was insufficient to establish the long-term impacts.

Kenneth D. Kerri, Ph.D., PE, Speaker - Background

Kenneth D. Kerri conducted research for Caltrans in the early 1980s on the development of stormwater runoff water quality forecasting models. Since 1995 he has worked with Caltrans on various aspects of the stormwater quality management program. He has been a member of the Transportation Research Board's Committee on Hydrology, Hydraulics, and Water Quality since 1983.

Infiltration Technology (continued)

Kenneth D. Kerri - Presentation Summary

Proposed Procedure for Siting Infiltration BMPs

Caltrans has proposed guidelines for the siting of infiltration BMPs. These guidelines were developed in cooperation with the RWQCBs and the SWRCB. The objective of the guidelines is to develop systematic procedures. The procedures consist of four major elements: (1) pre-screening, (2) site screening, (3) site investigation, and (4) preliminary design. Pre-screening includes collecting site-specific information, determining preliminary infiltration appropriateness, and consulting with the RWQCB. Site screening includes use of data from the pre-screening process and identification of potential sites for field screening. Site screening procedures include estimating infiltration rate, calculating infiltration area, and consulting with the RWQCB regarding distance setbacks and restrictions. Site investigation consists of listing candidate sites and performing a field site investigation. The last step is to perform a preliminary design and estimate the costs of construction and O&M. These procedures must be adjusted for site-specific situations. In summary, the siting of infiltration BMPs requires following the proposed systematic procedures and working with the RWQCB throughout the entire siting process.

Matt A. Yeager, M.S., Speaker - Background

Matt A. Yeager is an environmental scientist in the Stormwater section at the California Regional Water Quality Control Board, Los Angeles Region. He has an MS in geology from UCLA, and is a Doctoral Candidate at UCLA in the Environmental Science and Engineering Program, where he has focused on water quality issues.

Matt A. Yeager - Presentation Summary

The Regulatory Perspective on Infiltration BMPs

The conversion of the natural environment during development increases the proportion of impervious surfaces in the area, decreasing the infiltration capacity, and increasing the volume of storm runoff which carries increased pollutant loads derived from the new land uses. Infiltration BMPs are a means of restoring infiltration capacity, thereby reducing the storm runoff volume and reducing the runoff pollutant load by settling and filtration processes. The Regional Water Boards must weigh the benefits of infiltration against potential negative impacts to groundwater resources and insure that infiltration facilities are a viable long-term solution.

Alan Hofmann, PE, Session Expert – Background

Mr. Hofmann is the Assistant District Engineer with the Fresno Metropolitan Flood Control District. He earned his Bachelor of Science degree in Civil Engineering from California State University, Fresno. He has been with the District for 22 years. Mr. Hofmann currently manages the Design Department of the District with general oversight of project design, development review, technical resources and GIS. Prior to managing the design

department, he spent over 18 years as the Operations Engineer, involved in the construction, operation and maintenance of all District storm drainage, flood control and other operational facilities. Mr. Hofmann is a licensed Professional Engineer in California and a member of ASCE.